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DISEASE AND DEATH IN CANADA'S NORTH

by

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Introduction

Canada's north is a land of contrasts; 1.6 million square miles north of the 60th parallel or 42% of Canada's area. About a third of it is wooded - from the air a seemingly endless stretch of forest, lakes and winding rivers, broken here and there by barren mountains, many reaching more than 4000 feet. All this part lies to the west, occupied by the Yukon Territory, the valleys of the Mackenzie River and its tributaries, and the Great Bear and Great Slave Lakes. Eastwards the trees thin out rapidly, the edge of the tree area tapering in a ragged line from the delta of the Mackenzie southwards past the shore of Great Slave Lake to end in a straggle of stunted, wind-blown spruce just north of Churchill, Manitoba, on the shore of Hudson Bay.

In the west, the mountainous Yukon Territory occupies about half the wooded area. Nearly all its 14,600 people live well below the Arctic Circle, about 80% of them in circumstances not much different from many other Canadians. Its Indian[a] and Eskimo population is small. In the east, Northern Quebec juts above the 60th parallel and has an Eskimo population of over 2000. Between these geographic extremes the Northwest Territories present the greatest contrasts in geography, in economic development, in population distribution, in the pattern of births and deaths and in the story of disease. This paper is about health conditions in the Northwest Territories. Most of the mortality and morbidity figures are for 1960.

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[a] This term throughout this paper refers to North American Indians of Canada who are registered with the Department of Citizenship and Immigration.

The environment

The tree area of the Mackenzie Valley and the treeless area of Eskimo country eastwards: these are the striking geographical divisions of the Northwest Territories (see map). Superimpose on both a brisk, dry, frigid winter climate with long dark nights, and a short season of amazingly hot summer days, and consider that in all these 1.3 million square miles live only some 22,400 people, 60% of them in the tree area. In these factors can be found reasonable explanations for the pattern of disease and death.

The largest community is Yellowknife, on the north shore of Great Slave Lake, with a population of 3200 boasting running water and sewerage, two gold mines and a 40-bed modern hospital. Fort Smith on the southern border is the centre for local territorial administration, but the Commissioner's office is at Ottawa. The only other communities of any size are Hay River (1300), Inuvik (1200) and Frobisher Bay (1300).

There are a score of smaller settlements - usually nothing more than a general store, a school, mission buildings, perhaps a nursing station and a radio station, a few decent wooden frame houses and a scattering of log cabins or wooden shacks, or in the treeless area tents and shacks. In the "bush" between settlements, by the side of lake or stream, the Indian has his hunting and trapping cabin. On some lonely lak or seashore on the immense tundra, perhaps 100 miles from the nearest white man, the Eskimo pitches his tent or builds his shack (for the snow house is becoming a thing of the past), as a base for hunting the caribou, walrus or seal, or trapping the whit fox.

In the tree area, the trees provided the Indians with wood for building snug log cabins and fuel to heat them. Neat, multi-roomed, frame wooden houses are now replacing the log cabins in some places. In the treeless area the only building materials available to the Eskimos were caribou skins, sealskins and snow and the or fuel was seal-oil burned in primitive stone lamps. The changing seasons dictated changing the camp site. Insanitary conditions were left behind. With the coming of more and more white men the Eskimo of the treeless area learned to gather

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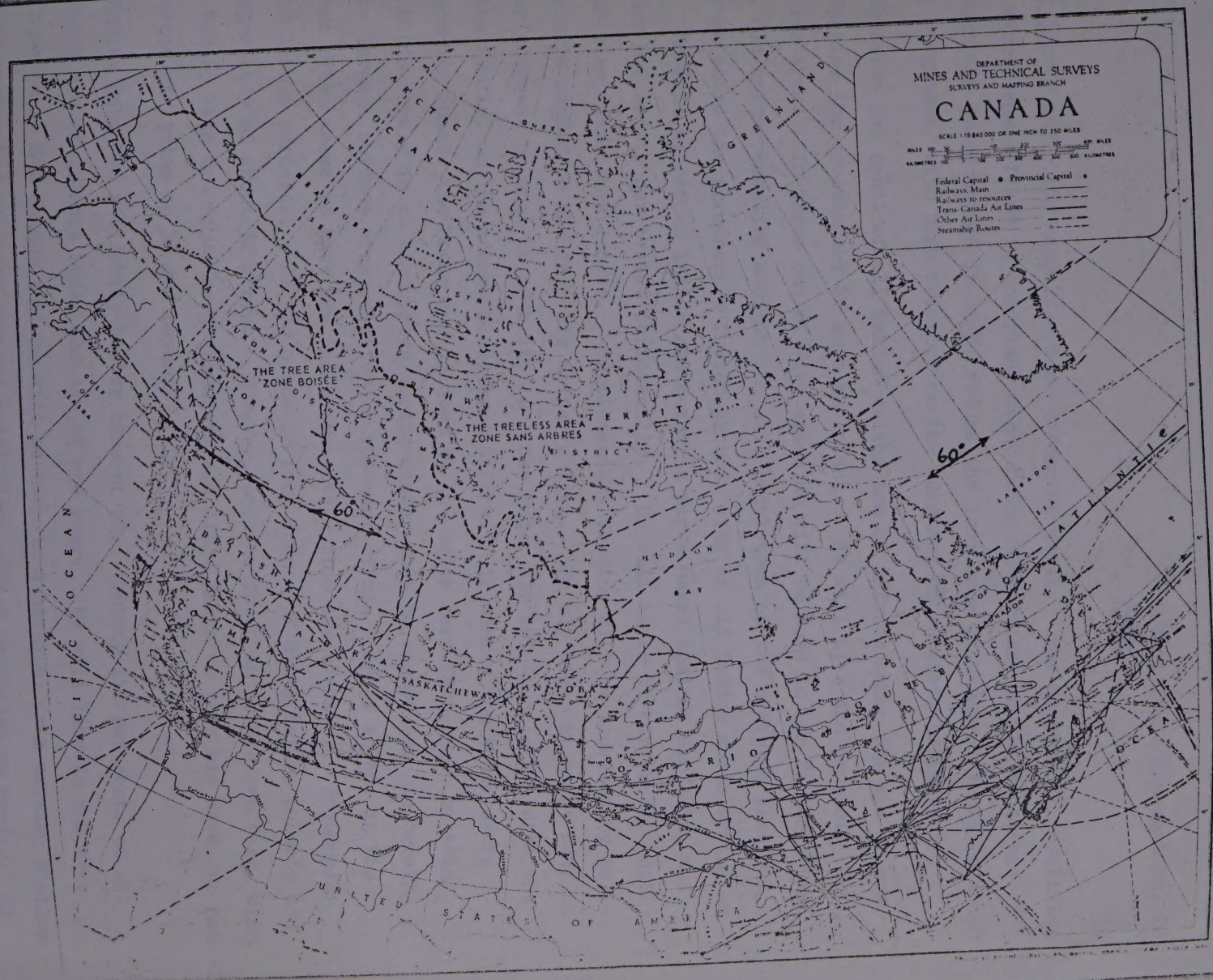

discarded lumber and build himself a more permanent shack. The Government, realizing that the warmer shack fixed in one place might bring an increase in the incidence of gastro-enteritis (even though it might reduce the incidence of pneumonia) has launched a housing programme, with high priority on the adequacy of sanitary facilities.

Fifty-seven per cent. of all Eskimo deaths are of infants under the age of one year. Imagine the environment of such an infant. He will live and probably die in the treeless area. In three out of five cases he will be born in his father's tent or shack, his mother kneeling amongst the skin bedclothes on the sleeping platform, a few inches above the permanently frozen ground, with an old Eskimo woman acting as midwife. He will be popped inside his mother's parka naked against her skin, and swung under her arm to her breast periodically. He will nurse at her breast until his second year, sometimes longer. Supplementary feeding will be provided by well-chewed morsels passed to him from his mother's lips. He may sleep at night next to his mother's breast or when he is a little older under the skin bedclothes with the rest of the family, on the common sleeping platform. In winter the temperature towards morning inside the house may go down to 10° below zero Fahrenheit or even lower. He is rarely in an atmosphere during winter when he cannot see his breath. He has the largest surface area relative to the mass of his body of anyone in the family, but often seems to have the least protection from the climate. Pneumonia stalks him like a murderer. He has a one in four chance of dying before puberty and a life expectancy of about 32 years. However, once he is up on to his own feet, with his skin boots, skin or woollen serge trousers and lined parka to keep him warm, he has a good chance of living to 32 and beyond.

An Indian baby has a slightly better time of it. Thirty-six per cent. of all Indian deaths are of infants under the age of one year. He will live in the tree area. There is an 84% chance that he will be born in a hospital or a nursing station and that his mother had at least one pre-natal visit with a physician or nurse. He will be taken home to a log cabin or a Government-sponsored wooden frame house, heated in winter by a big stove burning wood. He will usually be breast-fed, although his mother may be interested in bottle feeding. He may get infant cereal, orange juice, cod liver oil - and gastro-enteritis. In winter, while his father plays cards

ing at a table sweating, he may be playing on the floor where the frost shows ugh the cracks and where the wind whistles in every time the door is opened. live in two different temperature zones. Pneumonia stalks him too. He has a in eight chance of dying before puberty, but once on his feet, in warm woollen hing bought at the trading post, he has a good chance of making it to manhood even old age.

The child of "white status" parents has the best chance of survival. Although ay have Indian or Eskimo blood, he usually lives in a better house and eats er food, because his father is employed for wages. If his father works for the ernment or one of the big companies, he may live in subsidized housing heated by on food imported from southern Canada at considerable expense. More and more ians and Eskimos are entering this economic category, as the result of the ernment's greatly increased educational programme. In such circumstances the ld's chances of survival are good indeed, better in fact than in some places in south.

al statistics

Table 1 summarizes the story of birth, population distribution and death in the thwest Territories. Several facts stand out from these figures:

(a) By comparison with figures of other population groups these seem ridiculously small for the enormous area involved. Because they are small it is dangerous to draw firm conclusions from them.

(b) The Indians live in the tree area, the Eskimos live in the treeless area and the persons of "white status" live in both areas but chiefly in the tree area.

(c) The Eskimos and Indians together make up more than half of the population.

(d) The Eskimo birth-rate is high, one of the highest in the world; more than twice the southern Canadian rate of 26.9. The Indian rate lies between them.

(e) The 10 Eskimo stillbirths, out of the Northwest Territories total of 12, reflect the relatively hard life and low standard of Eskimo living.

(f) The Eskimo general death-rate is nearly three times that of the white status population. Again the Indian rate lies between.

TABLE 1. NORTHWEST TERRITORIES

Area, Population, Births and Deaths

1960

Item	Totals		The Tree Area		The Treeless Area	
	Number	Rate %	Number	Rate %	Number	Rate %
Area in square miles	1 304 903	100	335 000	26	970 000	74
Population	22 372	100	13 398	60	8 974	40
Indians	4 671	21	4 671	21	0	-
Eskimos	7 936	35	840	4	7 096	32
White Status	9 765	44	7 887	35	1 878	8
Births	1 055	47[a]	592	44[a]	463	52[a]
Indians	210	45	210	45	0	-
Eskimos	507	64	67	80	440	62
White Status	338	35	315	40	23	12
All Canada		26.9				
Stillbirths	12	11[b]	4	7[b]	8	17[b]
Indians	1	5	1	5	0	-
Eskimos	10	20	2	30	8	18
White Status	1	3	1	3	0	-
All Canada		13.5				
Deaths	298	13[a]	125	9[a]	173	19[a]
Indians	59	13	59	13	0	-
Eskimos	186	23	18	21	168	24
White Status	53	5	48	6	5	3
All Canada		7.8				

[a] per 1000 population

[b] per 1000 live births

Table 2 sheds more light on this matter. The death-rate of 211 for Eskimo ts and their neonatal mortality rate of 75, coupled with the words "pneumonia" ronchopneumonia" on many of their death certificates, suggest low resistance fection, lack of warmth and shelter, overcrowding, indifferent parental care a respiratory infection starts, and lack of urgent medical care. The word turity" on some death certificates is a significant factor. Although the t mortality rate of 100 for Indians is better than the Eskimo rate, it is still than three times the national rate of 27.

One would expect the white status infant mortality rate to be significantly er the all-Canada rate if all these arguments hold true. That the rate is 65 is ably due to the fact that some families of mixed Indian or Eskimo and white blood included in the white status group, some with rather poor living conditions.

The one encouraging fact in this table is the complete absence of maternal ality, even amongst the 507 Eskimo births; a testimony to the hardiness of these n, 59% of whom were delivered in their own homes without physician or nurse. proficiency of the Royal Canadian Mounted Police in investigating sudden or sual deaths in the Northwest Territories gives support to these figures.

ses of death

Table 3 gives the causes of death by selected age-groups.

Physicians and nurses in Canada's Northern Health Service are not surprised that umonia heads the death list. With "pneumonia of the newborn" this disease accounts 32% of all the deaths. No doubt some of the deaths certified under the category nility and unknown causes (B45)" were also caused by this disease. Because these orts were made in good faith by missionaries, administrative officers or members the Royal Canadian Mounted Police, more precise information cannot be expected. leed, it is encouraging that 152 out of the 298 death certificates for 1960 were gned by qualified medical practitioners and 23 more by registered nurses.

TABLE 2. NORTHWEST TERRITORIES

Infant, Neonatal and Maternal Deaths

1960

Item	Totals		The Tree Area		The Treeless Area	
	Number	Rate	Number	Rate	Number	Rate
Infant Deaths[a]	150	142[c]	52	88[c]	98	212[c]
Indians	21	100	21	100	0	-
Eskimos	107	211	9	134	98	223
White Status	22	65	22	70	0	-
All Canada		27				
Neonatal Deaths[b]	55	52[c]	18	30[c]	37	80[c]
Indians	5	24	5	24	0	-
Eskimos	38	75	1	15	37	84
White Status	12	35	12	38	0	-
All Canada		18				
Maternal Deaths	0	-	0	-	0	-
All Canada		4.5[d]				

[a] infants under one year of age

[b] infants under 28 days of age

[c] per 1000 live births

[d] per 10 000 live births

TABLE 3. NORTHWEST TERRITORIES

Causes of Death in Order, by Selected Age-Groups

1960

uses of Death Group	Totals	Infants Neonatal 1-27 days	Infants 28-364 days	Pre-school 1-4 years	School 5-14 years	Young Adult 15-34 years	Adult 35-64 years	Elderly 65+ years
monia (B31)	84		44	10	1	5	15	9
lity and Unknown uses	60	13	20	3	2	4	7	11
ases of Infancy 41-44)	42	41		1				
ries (BN47-50)	42	1	4	2	8	19	8	
tro-intestinal iseases (B33-36)	20		14	1		1	4	
diovascular iseases (B24-29)	12					1	1	10
er Infective and arasitic (B3-17)	9		5	3		1		
eases of Nervous ystem (B22-23)	8		4				3	1
erculosis, All orms (B1-2)	6			1	1	2	2	
er Respiratory iseases (B30 and 32)	5		3	1			1	
plasms (B18-19)	5					1	2	2
plications of regnancy (B40)	0							
Other Diseases (B46, 20, 21, 37-39)	5		1		1		2	1
l causes including injuries	298	55	95	22	13	34	45	34
tal Infant Mortality		150 or 50% of all deaths						
tal Child Mortality		185 or 62% of all deaths						

culosis lies low on the list, killing only six people, all Eskimos. This inct improvement over the mid-1940's, when between 35 and 40 Eskimos died of ase annually.

ro-enteritis in infants is lower than might be expected. Along with the of the climate it is believed that the almost universal Eskimo and Indian of breast feeding accounts for this.

ether the communicable diseases have taken their toll. The improvement in tic communications in the mid-1950's, added to the south-north air routes ame so well established during and after World War II, helped to carry new of organisms great distances in a short time and mix the strains already in h. This is demonstrated by the rapid spread of epidemics during 1954 to nd is reflected in the rising Eskimo infant mortality rate of these years ble 4). Some of the increase in this rate was probably due to improved ng.

TABLE 4. NORTHWEST TERRITORIES

Eskimo and All-Canada Infant Mortality Rates Compared, 1950-1961

	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961
skimo Infant eaths/1000 Live irths	196	131	175	197	155	208	250	228	240	206	211	193[a]
11-Canada Infant eaths/1000 Live irths	42	39	38	36	32	31	32	31	30	28	27	

[a] Preliminary figure

In southern Canada injuries account for about 8% of all deaths. In the north account for 14%, reflecting the hard, dangerous life, since most of them are to drowning, exposure, gunshot wounds or aircraft crashes.

e 5 shows differences between the ethnic groups as to causes of death. (B31) and "pneumonia of the newborn" (extracted from B43) accounted for he Indian and 39% of the Eskimo deaths. These figures reflect the relatively helter and warmth enjoyed by the Indians living in the tree area in fairly ial wooden houses with plenty of wood for fuel. The white status figure of s to bear out this statement.

rate for "senility and unknown causes (B45)" amongst the white status on is lower than for the Indians and Eskimos because most live in the larger ents where there are hospitals or nursing stations.

TABLE 5. NORTHWEST TERRITORIES

Causes of Death in Order, by Ethnic Group

1960

uses of Death Group	Totals		Indians		Eskimos		White Status		All Canada Rate
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	
onia (B31)	84	375[a]	14	299[a]	64	803[a]	6	61[a]	30[a]
ity and Unknown ses (B45)	60	268	11	235	39	492	10	102	8
ses of Infancy 41-44)	42	188	6	128	23	290	13	133	55
ries (BN47-50)	42	188	7	150	20	252	15	154	62
ro-intestinal Diseases 33-36)	20	89	8	171	10	126	2	20	17
iovascular Diseases 24-29)	12	54	6	128	2	25	4	41	282
er Infective and rasitic Diseases (B3-17)	9	40	2	43	7	88			5
eases of Nervous System 322-23)	8	36	1	21	6	76	1	10	88
erculosis, All Forms B1-2)	6	27			6	76			5

TABLE 5 (continued)

es of Death Group	Totals		Indians		Eskimos		White Status		All Canada Rate
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	
espiratory Diseases and 32)	5				3		2		8
sms (B18-19)	5		3		2				132
eations of Pregnancy)	0								1
her Diseases (B46, 20, 37-39)	5		1		4				93
uses including ries	298	13.3[b]	59	12.6[b]	186	23.4[b]	53	5.4[b]	7.8[b]

per 100 000 population

per 1000 population

njuries head the list of causes of death amongst Canadians between the ages of ar and 40 years. It is not surprising, therefore, that in the Northwest ories they should head the list for the relatively young white status group. te for the Indians is about the same as for the white status group, but the rate is higher.

urther down the list the numbers are so small as to brand any discussion as speculation. A few neoplasms are listed, all of them certified by physicians. os more lie amongst the 18 "unknown" causes listed under the 35-64 and 65+ age-s. Schaefer[1] has analysed 32 confirmed neoplasms over a number of years in ian Eskimos. Amongst them were 8 of the parotid gland, 3 hypernephromas, 3 noma of the large bowel, 3 carcinoma of the oesophagus, 2 carcinoma of the lung, cinoma of the cervix and 2 carcinoma of the ovary. There were no neoplasms of t or prostate.

e figures for "cardiovascular diseases (B34-36)" are dangerously interesting, larly the rates compared with the all-Canada rate of 282 per 100 000 population. r[2] reports personal communications from two pathologists, one on some 30 es of Western Arctic Eskimos and the other 17 autopsies of Eastern Arctic : "atherosclerosis occurs in Eskimos over 60, but . . . less extensive and than in Caucasians of the same age-group". A great deal more autopsy experience uired before more is said.

ss

f the 15 practising physicians in the Northwest Territories, 8 are government ed. Of the 15 nursing stations, where patients attend for simple out-patient -patient care by registered nurses, under the direction, by radio, of the t physician, 11 are government operated. The distribution of their case load resentative of the Indian and white status population of the tree area but also some indication of the case load in Eskimo country. Table 6 shows the number ir patients for each quarter of the year, arranged in order by disease group.

s might be expected, respiratory illness required the most attention (22%). f these patients had acute upper respiratory infections. Table 7, listing ics, provides additional information. Influenza was the chief disease and in ases was complicated by bronchopneumonia, aggravated by a low standard of living ck of adequate shelter and warmth. The isolated locations of the patients rly all cases made it difficult, if not impossible, to obtain blood samples aboratory confirmation. In one or two instances the epidemics were far ced before communications could be established and a medical rescue party dis- ed to the scene by aircraft. Such an instance was the outbreak of influenza lly Bay, 450 miles from the nearest physician and 300 miles from the nearest ng station, where 130 Eskimos and one white man suffered from the disease and kimos died (12%).

TABLE 6. NORTHWEST TERRITORIES

Cases Recorded in Northern Health Service Facilities,[a] by Disease Classification

1960

Section	Disease Group	I.S.C. Number	Case Totals		Quarters of the Year			
			Number	%	January to March	April to June	July to September	October to December
VIII	Diseases of the Respiratory System	470-527	3 495	21.7	797	905	1 027	766
IX	Diseases of the Digestive System	530-587	3 306	20.5	428	1 046	837	995
XVII	Accidents, Poisonings and Violence	N800-N999	1 901	11.8	305	502	688	406
XII	Diseases of Skin and Cellular Tissues	690-716	1 421	8.8	233	327	464	397
XVI	Symptoms, Senility and Ill-defined Conditions	780-795	1 261	7.8	276	320	358	307
VI	Diseases of Nervous System and Sense Organs	330-398	1 175	7.3	269	266	374	266
	Special Conditions and Examinations without Sickness	Y00-Y09	1 044	6.5	211	225	283	325
I	Infective and Parasitic Diseases	001-138	460	2.9	115	100	105	140
X	Diseases of the Genito-urinary System	590-637	378	2.3	82	91	102	103
XIII	Diseases of Bones and Organs of Movement	720-749	259	1.6	51	82	85	41
XI	Deliveries without Complication	660	257	1.6	56	84	53	64
XI	Deliveries with Specified Complication	670-678	16	0.1	3	5	5	3
XI	Other Complication of Pregnancy and Puerperium	640-649 650-652 680-689	82	0.5	11	20	29	22
VII	Diseases of the Circulatory System	400-468	173	1.1	37	23	61	52
III	Allergic, Endocrine, Metabolic and Nutritional Diseases	240-289	123	0.8	26	33	39	25
V	Mental, Psychoneurotic and Personality Disorders	300-326	94	0.6	31	23	18	22
XV	Certain Diseases of Early Infancy	760-776	84	0.5	8	21	28	27
IV	Diseases of the Blood and Blood-forming Organs	290-299	56	0.3	30	9	7	10
II	Neoplasms	140-239	48	0.3	14	12	9	13
XIV	Congenital Malformations	750-759	17	0.1	1	8	6	2
	Unspecified and Miscellaneous	000 and Y10-Y19	459	2.9	109	60	82	208
	All Diseases		16 109	100	3 093	4 162	4 660	4 194

[a] [illegible] physicians and 11 out of the 15 nursing stations (in charge of registered nurses) in the Northwest

TABLE 7. NORTHWEST TERRITORIES

Epidemics or Unusual Outbreaks of Disease

1960

Date	Location	Disease	Number Cases	Deaths	Remarks
January	Fort McPherson	Measles	169		
February	Boothia Peninsula Spence Bay	Influenza	40 to 50	4	
February	Eskimo Point	Typhoid Fever	2		
March	Hall Lake	Whooping Cough	?	3	One death age 9 months
April	Spence Bay	Paralytic Poliomyelitis	2		Female Eskimos ages 2-1/2 and 5 years
April	Bathurst Inlet	Influenza	60		Total population, all Eskimos
April	Cambridge Bay	Influenza	60		
April	Spence Bay	Influenza	60	1	
April	Gjoa Haven	Influenza	15		
April	Trout Rock (Yellowknife)	Influenza	21		All Indians, Total population 56
May	Coppermine	Influenza	206		Total population at risk = 375; Eskimos 228 Whites 47 Cases: 184 Eskimos, 22 Whites, or 55%
June	Pelly Bay	Influenza	131	16	
June	Hall Lake	Influenza	4	1	Child 10
May	Eskimo Point	Measles	25		
May	Rankin Inlet	Measles	61		
June	Fort Norman	Measles (German)	24		Confined to native population
August	Lake Harbour	Botulism	3	1	
October	Inuvik	Influenza	20		Confined to hostels
November	Grise Fjord	Whooping cough Bronchopneumonia	6	1	Population at risk = 60 Eskimos, 2 RCMP whites. Reported cases all children under 5 years.
December	Inuvik	Infectious Hepatitis	39		

Diseases of the digestive system came second on the list, but 80% of these were
e sub-group "diseases of buccal cavity and oesophagus", mostly dental caries and
mmatory conditions of the gums. There is a shortage of dentists in the North-
Territories and in many of the smaller settlements the local physician or nurse
provide palliative care. Diseases of the stomach, duodenum and intestines
unted for another 17% of the complaints of patients in this group. Schaefer[2]
: "there are, as yet, no cases on record of peptic ulcer occurring in Canadian
mos". As one would suppose, the relatively insanitary conditions of the Indian
Eskimo homes give rise to some bowel infections in young children. This is
orted by Table 3 which shows 8 Indian and 10 Eskimo deaths from diseases in this
p. In the age-group 28-364 days, 6 of these were Indians and 7 were Eskimos.

Accidents, poisoning and violence came third on the list of patients (12%). They
ed 14% of the deaths, half being Eskimos. Schaefer[2] points out that "drowning of
dren . . . happens every summer in the labyrinth of channels and lakes in the
kenzie delta. The loss of hunters is greater in the Eastern Arctic, where most
lost in winter and spring whilst hunting on the ice floe edge, which may break off
sudden storms". Of 17 Eskimo deaths from drowning and exposure, 14 were in the
ool and young adult age-group (see Tables 3 and 5). The active outdoor life of
Indian and Eskimo hunter, with gun, trap and knife, results in a fair number of
idents. Probably there are many which, treated by time-honoured remedies, are
er heard of by physicians or nurses.

Diseases of the skin and cellular tissues brought 9% of the patients. This might
expected, since every drop of water for seven or eight months of the year must be
tained by burning precious fuel, except in a few of the larger communities where a
ed water-supply has been provided. Scabies is a constant problem for public
alth nurses in most settlements of the tree area, amongst the Indians and mixed-
ood families. It occurs also amongst some Eskimo groups. Overcrowding of their
all cabins and absence of an adequate water-supply makes treatment a heart-breaking
siness. Frequently the scabies is found to be complicated by impetigo.

Of the 1175 patients (7%) complaining of "disorders of the nervous system and
nse organs", 444 came because of diseases of the eye, most of which were for
nflammatory conditions.

here is good reason to be concerned about eye disease in the Northwest ories. A physical examination of some 1600 Eskimos during the annual medical of the Eastern Arctic in 1955, showed that 9% had defects of vision or lesions eye found by simple inspection. Half of these were serious conditions, many m labelled phlyctenular keratoconjunctivitis.

uggan & Hatfield[3] investigated the incidence of this eye condition amongst and Eskimo patients at the Charles Camsell Hospital in Edmonton, Alberta, in Of 467 patients they found evidence of past or present phlyctenulosis in 161 17%). In 1957, Van den Berg had found that 19% of the Eskimos examined on the medical survey of the Central Arctic had evidence of eye disease, of which l scarring formed a high proportion. In 1958 Reed & Hildes[4] examined 503 l Arctic Eskimos, finding 35 (7%) with phlyctenular scarring of the cornea, probable herpetic corneal scars and 40 with evidence of other eye disease, all.

able 8 summarizes the work of the Government ophthalmologist during a nine period in 1959-1960, chiefly in the Mackenzie Valley and the Western Arctic. f the congenital eye diseases amongst the Indian and Eskimo patients were es of the lids. The chief problems encountered were the high percentage of ess, from tuberculosis or trauma, and the apparent increase in refractive (chiefly myopia) in children placed in school hostels on a "white status" diet. crease was particularly noticeable in the Indian and Eskimo children.

Six-hundred-and-sixty-one patients attended for "diseases of the ear and mastoid ss" (56% of the group "diseases of the nervous system and sense organs" or 4% l cases listed in Table 6). The greatly increased school programme has borne hat northern physicians and nurses had already discovered: there is a high ence of middle ear disease with partial loss of hearing in some cases, particularly st pre-school and schoolchildren, no doubt an offshoot of the high incidence of respiratory illness. In 1961, a survey of hearing performed on 716 school-ren at the new town of Inuvik in the Mackenzie delta area, showed 72 (10%) with nce of chronic middle ear disease, 23 (3.2%) showing some loss of hearing, 8 ring hearing aids (1.1%), 16 of these children showed evidence of mastoid se on X-ray.

TABLE 8. NORTHWEST TERRITORIES

Eye Cases Attended by Government Ophthalmologist,
Mackenzie and Western Arctic

1959-1960

Item	Totals		Children		Adults
	Number	%[a]	Pre-school	School	
All Ethnic Groups					
Patients Seen	2 253	100	162	1 433	658
of acquired disease	725	32	35	346	340
of congenital disease	369	16	71	244	54
of trauma	115	5	5	42	68
asms	2		1	1	0
thalmos	7		0	2	5
lind eye	77	3	2	22	57
	44	2	1	12	31
Indians					
Patients Seen	760	100	42	496	222
s of acquired disease	273	36	10	134	129
s of congenital disease	170	22	26	128	16
s of trauma	28	4	1	10	17
lasms	1		0	1	0
nthalmos	0		0	0	0
blind eye	37	5	0	12	25
d	19	3	0	3	16
Eskimos					
l Patients Seen	841	100	102	430	309
es of acquired disease	294	35	18	124	148
es of congenital disease	165	20	39	98	28
es of trauma	59	7	3	24	32
plasms	1		1	0	0
phthalmos	6		0	2	4
blind eye	23	3	1	8	18
nd	21	3	0	8	13

TABLE 8 (continued)

Item	Totals		Children		Adults
	Number	%[a]	Pre-school	School	
White Status					
Total Patients Seen	652	100	18	507	127
Cases of acquired disease	158	24	7	88	63
Cases of congenital disease	28	4	1	8	19
Cases of trauma	34	5	6	18	10
Neoplasms	0		0	0	0
Anophthalmos	1		0	0	1
One blind eye	17	3	1	2	14
Blind	4		1	1	2

[a] Percentage of total patients seen in the ethnic group

Schaefer[2] says that "epilepsy is often seen in Eskimos. The common familial idence suggests that most cases are idiopathic, but in a few cases cerebral erculomata have been demonstrated".

The 1044 patients (6%) who attended for "special conditions and examinations hout sickness" are a testimony to the active public health programme, which it hoped this year will offer, in addition to the periodic medical examination of ry schoolchild, medical examinations of pre-school children and of couples ning marriage. The private physician will be invited to take part through a ial schedule of fees for public health services.

The eighth position on the list is occupied by "infective and parasitic diseases" 3% of the patients. One hundred and two of these were cases of venereal diseases. l recently gonorrhoea and syphilis were confined almost entirely to the tree area, gst Indians and persons of white status; only the occasional Eskimo case was seen. ver, with the advent of transarctic communications and with more and more Eskimos he move in search of wage employment at the larger centres, venereal disease is nning to appear amongst them. Table 9 summarizes the picture for the last four rs. Whereas the rate for gonorrhoea is six times the all-Canada rate, the idence of syphilis has dropped sharply.

TABLE 9. NORTHWEST TERRITORIES

Venereal Disease

1961

Period	Gonorrhoea			Syphilis		
	Number Cases	N.W.T. Rate[a]	Canada Rate[a]	Number Cases	N.W.T. Rate[a]	Canada Rate[a]
January-June	45	391	86	0	-	3.3
July-December	93	809	96	1	4.4	3.2
Totals	138	600	91	1	4.4	3.2
1960	74	331	88	10	45	2.6
1959	45	207	85	35	161	2.2
1958	103	485	87	-		1.2

[a] per 100 000 population

here were some cases of tuberculosis. As a cause of death it ranks ninth
e list (Tables 3 and 5), but the incidence of new active cases gives concern.
10 summarizes tuberculosis control for 1960 and 1961. Most of the new cases
st Eskimos were found by X-ray surveys, while most of the Indian and white
s patients were found by other means; usually by referral by physicians and
s but some on admission to hospital for other reasons.

In some of the smaller settlements annual chest X-ray coverage of the population
mplete. The Eskimos are easier to reach than one might think because of their
of travelling to the settlements at Easter and Christmas for religious services
in the Eastern Arctic, to await the arrival of the summer supply ship. As is
ase in southern Canada, attendance by the white status population in the larger
nities is poor, even though the disease is by no means eliminated.

TABLE 10. NORTHWEST TERRITORIES

Tuberculosis Control

1960 and 1961

	Totals		Indians		Eskimos		White Status	
Population	1960	1961	1960	1961	1960	1961	1960	1961
Number	22 372	22 998	4 671	4 796	7 936	8 207	9 765	9 995
%	100		21	21	35	36	44	43
Case Finding								
Total New Active Cases	187	181	51	32	112	129	24	19
Incidence of Identified New Active Cases in Population (%)	0.8	0.8	1.1	0.7	1.4	1.6	0.2	0.2
By Surveys								
Number X-rayed	14 673	15 961	3 857	3 520	6 398	7 037	4 418	5 404
% Population X-rayed	66	69	83	73	81	86	45	54
New Active Cases	84	105	6	6	75	94	3	5
Number Persons X-rayed Per Case	175	152	643	587	85	75	1 473	1 081
By Other Means								
New Active Cases	103	75	45	26	37	35	21	14
Treatment								
Number Persons Admitted to Hospital	248	209	73	36	145	153	30	20

The incidence of identified new active cases among the Eskimos is about twice he Indian incidence and eight times the "white status" incidence. The Eskimo ncidence varies by area. The Eskimos of the Eastern Arctic have an incidence of .1%. In the Central Arctic the incidence is 1.0% and in the Western Arctic 1.3%.

The differences between the total new active cases and the number of patients admitted to hospital for the treatment of tuberculosis are due to cases of reactivation of the disease or readmissions to continue treatment.

In 1960 there were two cases of typhoid fever at Eskimo Point and in 1961 two cases at Holman Island, 1200 miles to the north-west. Schaefer[2] mentions two cases of typhoid fever on the Eastern Arctic coast which he considers were infected from a carrier who survived the 1941-1942 epidemic in this area that killed more than 10% of the population. Greenberg, Blake & Gorman[5] in an immunological study of 830 Eskimos in the Eastern Arctic and 193 Eskimos in the Western Arctic found "O" titres of 1:16 or higher for Salmonella typhi in 12% but "H" titres of 1:16 in only 3%. Considering that their samples came from about 10% of the Eskimo population, they expressed surprise at the low incidence of both "O" and "H" agglutinins, "since sanitation is poor and living conditions are primitive".

The northern Indians and the Eskimos usually suffer heavily from outbreaks of the so-called "childhood diseases" - simple measles, German measles, chicken-pox and mumps. Peart & Nagler[6] described a typical epidemic of simple measles in the Eastern Arctic in 1952. The attack rate was over 99% of a population of about 1800, with a mortality rate in the Ungava Bay area of 7% and on Southern Baffin Island of 2%. There is so much bronchopneumonia through secondary infection in these epidemics that it is hard to say whether it or the primary virus infection causes the most sickness and death. Both are aggravated by the poor living standards, the inadequacy of housing, lack of warmth, overcrowding and absence of proper bed rest and home nursing, to say nothing of the absence in many cases of necessary medical attention, due to poor communications and logistic difficulties, which nearly always hamper medical work. The effects are debilitation of the patients, lighting up of inactive tuberculosis, middle ear disease and chronic bronchitis. Table 7 outlines the story of epidemics for 1960.

There have been epidemics of paralytic poliomyelitis amongst the Eskimos. Johnsen & Wood[7] described 10 cases with 3 deaths out of an isolated group of 36 Eskimos and 5 whites at Maguse River, in October, 1953. Although Salk vaccination of the Eskimos commenced in 1955 and has been a feature of the annual medical patrols

ongst them ever since, there were 12 cases in 1959, 11 of them confined to an area me 500 miles in diameter involving Central Baffin Island and the Melville Peninsula. ght were male and 4 female. Seven were in the 15-34 years "young adult" age-group. ere were 4 deaths, 3 male and 1 female. There was evidence that one of the patients l had two doses of Salk vaccine a year apart and that one patient had had one dose of e vaccine. There were two cases of paralytic poliomyelitis in 1960, both in the othia Peninsula area and both in little Eskimo girls. Both survived.

In 1953, Matas & Corrigan[8] described a case of brucellosis in an Eskimo boy aged years, living at Bathurst Inlet. In 1954, Corrigan & Hanson[9] found brucellosis a 49-year-old Eskimo woman from the same community. Both cases were confirmed by e marrow culture. Greenberg, Blake & Gorman[5] found that in blood samples from 1 Eskimos, 3 had titres of 1:8 or higher for Br. abortus.

Hildes, Wilt & Stanfield,[10] in blood samples from 410 Eskimos in the Central l Eastern Arctic, found 115 (28%) with antibodies to psittacosis. They point out t certain diseases which usually produce crossing antibodies, such as cat scratch er, lymphogranuloma venereum, syphilis and trachoma, can be excluded on clinical unds.

Cases of trichinosis are reported from time to time, particularly from the tern and Central Arctic, and some deaths in the past few years have been attributed this disease. Brown et al.,[11] in 1948, obtained a positive skin test in 46% of Eskimos on Southampton Island in the Central Arctic. In another series (12), in 9, out of 100 Eskimos at Igloolik further north, they found that 22% gave a positive ction to the skin test. The trichina has been found in a great variety of Arctic mals. Until the Eskimos stop eating titbits of raw meat, the disease will remain ngst them.

Hydatid disease amongst Indians and Eskimos, due to the cysts of Echinococcus nulosus, has interested the physicians in the Northern Health Service for years, a finding incidental to chest X-ray surveys for tuberculosis or as a clinical ity in its own right. Miller,[13] in 1953, mapped the locations of 59 Indian cases the tree area of the Northwest Territories and described the epidemiology of the ease. He found 15% positive and 12% doubtful positive reactions to the Casoni

ntradermal test. Meltzer, Kovacs, Orford and Matas,[14] at the Charles Camsell spital in Edmonton, collected 180 cases of hydatid cysts in the livers and/or the ngs of Indian and Eskimo patients, an incidence of 2.7%. Cameron[15] stated that n some northern areas nearly 40% of the Indians reacted positively to skin sensitivity sts".

Brown et al.[16] in 1947 found evidence of fish tapeworm in 9 out of 95 Eskimos amined on Southampton Island. In 1949,[12] at Igloolik, they found ova of a phyllobothrium species in 32 out of 97 Eskimos. Wolfgang[17] in 1954 reported 10 ses amongst 105 Indian and Eskimo hospital patients, of whom 9 were Eskimos from e Hudson Bay area. Arh[18] in 1960 reported an incidence of 77% in the Port Harrison ea of Northern Quebec, based on stool samples from 328 Eskimos, but this was thought be unusual, as the incidence in Eskimo patients at the Moose Factory (Ontario) dian Hospital in 1957 was 21%.

Changes that are already taking place in their living standards will change e picture of parasitic infestation of Eskimos in wage employment. With better using have come garbage disposal and better sanitary facilities, including safer ter-supplies. More use is being made of imported, processed food. Cooking thods are improving. There is better control of sled dogs around the larger ttlements and employed Eskimos have less need for dogs. Some of the old habits ill remain, however. The catching of meat for future human consumption resulted three cases of botulism in 1960 with one death. In 1961 there were several cases the Western Arctic with one death.

Table 6 shows 355 patients who attended for conditions either directly or irectly associated with pregnancy. Of 273 deliveries, only 6% had complications. ere were 40 cases of abortion and 42 other cases of various complications of egnancy.

Seventy per cent. of 173 patients complaining of diseases of the circulatory stem came because of varicose veins, phlebitis and adenitis. Any suggestion that e apparently low incidence of cardiovascular disease is due to almost complete sence of the stresses of city life must be taken as pure speculation. It should remembered that the population is relatively young.

There were 77 patients complaining of allergic disorders, 9 with conditions of thyroid gland, 14 with diabetes mellitus, and 23 with other metabolic or itional diseases. Scott & Griffith[19] mentioned 3 confirmed and 2 possible cases iabetes mellitus in a population of 16 000 Alaskan Eskimos. Schaefer[2] says that could not find one during four years of medical activity in the Arctic . . . even r hospital conditions with a sudden change to a high carbohydrate diet no etes has been found so far in Eastern Arctic Eskimos. Three Western Arctic mos, patients in the Charles Camsell Hospital (Edmonton), have been discussed ossible cases. None of them presented a clinical picture of frank diabetes itus . . . I am indeed surprised that we do not find many more old Eskimos with diabetes as a result of the great dietary changes during the last years in the dian Arctic".

There were 17 patients with mental deficiency or minor disorders of behaviour, ith psychoneuroses and 14 with psychoses.

It may seem strange that there were only 84 patients in the group "certain rders of early infancy" (I.S.C. 760-776), particularly in view of the mortality res in Tables 3 and 5. Because of their isolated location, many of the younger ents whose deaths appear in these tables could not receive medical attention in . On the other hand, it has been suggested that the Eskimo or Indian baby, ly always breast-fed and spending much of his time literally in contact with his er inside her parka against her skin, escapes the infections and injuries of the t month of life. Perhaps his worst time in babyhood comes when he gets too y to carry and is pushed out into a new world of jumbled skin bedclothes on the nal sleeping platform or swung in a hammock from the rafters, in a home that is ded with people and tobacco smoke, draughty, sometimes very cold and usually nitary.

There were 56 cases of "diseases of the blood and blood forming organs". nowitch,[20] in 1936, reported haemoglobin levels in 8 adult Eskimos with a history pistaxis and found them all above the normal range. In 1957, during the annual al surveys in the Eastern and Central Arctic, normal haemoglobin levels were amongst Eskimo adults. However, Sellers, Wood & Hildes,[21] studying 331 Eskimo

ldren and 344 Eskimo adults in the Central Arctic in 1959 found that about 40% the Eskimo children between 8 and 23 months of age had haemoglobin levels below grams/100 ml. The percentage with haemoglobin levels of this order decreased with reased age and in the age-group 10 to 14 years there were only 2 children with this el. In contrast with the findings of Rabinowitch, they found that "both male and ale adult Eskimos have a lower mean haemoglobin concentration than the standard for American white population". It is thought that anaemia in Eskimo babies may be to prolonged breast feeding with lack of an adequate supplementary diet until after first year of life.

Schaefer,[2] from his own experience after four years of medical practice in the kenzie delta area and on Baffin Island, mentions a number of other diseases. On subject of avitaminosis he says: "vitamin A is . . . not scarce but rather ndant in the Arctic. Vitamin B Complex deficiencies were seen to some degree around ding posts . . . Vitamin C deficiency . . . is actually never seen in people eating quate amounts of fresh meet . . . Vitamin D deficiencies do not occur in Arctic ples who live predominantly on native food and whose children are breast-fed. ere degrees of scurvy as well as rickets are to be seen in bottle-fed children are not given vitamin supplements".

provision of health services

Compared with public health and treatment agencies in southern Canada, the artment of National Health and Welfare, through its Northern Health Service, must to cope with proportionally more sickness and death, much more widely scattered, ough more inaccessible country, in generally worse weather, with more limited nsportation facilities, occasionally poor communications and with limited funds. problems to be overcome are not so much those of public health or medicine per se of logistics. It is not a difficult matter to have a nurse give an injection of icillin or a dose of diphtheria toxoid to an Eskimo, and have an X-ray technician e a film of his chest, once they are on the spot. It is the business of getting m there at the right time with the facilities they need that presents the major blem.

Every part of the work of providing health services in the Northwest Territories s affected by these considerations. A field nurse or a travelling medical or dental fficer reaches fewer people in the north because of the time that must be spent ravelling, unpacking equipment, organizing space for public health or treatment urposes, sometimes even doing emergency repairs on mechanical equipment, or keeping toves going or lights burning.

Apart from the higher cost of living, it is not much more difficult to provide ealth services at Hay River, Yellowknife or Inuvik than it is in towns of similar ize in southern Canada. However the cost of bringing modern, complete health ervices to the smaller settlements of the tree area or to the scattered camps of the reeless area would be prohibitive. How could every pregnant Eskimo woman be given he equivalent of a monthly visit to a physician's office or to a health centre - such s many of her southern Canadian sisters take for granted - without flying her out to he nearest nursing station or hospital?

Northern Health Service is pushed to a dilution of service by distance, time and parseness of information. News of a baby's illness may have to be carried by his ather over scores of miles by dog team to the nearest nursing station, the journey erhaps taking several days. Often by the time help can be sent the baby is dead. ven when transportation is organized, weather often prevents medical or nursing ersonnel reaching a patient. All too often the people must muddle through as best hey can, surviving by reason of their hard learned native ways or going under if the um total of the pressures of climate, poverty, dirt and disease defeats them.

The first line of defence under these circumstances, particularly for those who ive at some distance from sources of professional care, must surely be the arming of ll residents with at least some of the knowledge and the means to prevent disease by he preservation of health, and with knowledge of first aid and home nursing. Well-rained and experienced professional medical, dental and nursing personnel must be eployed at strategic points chosen because they are centres of population or are ross-roads for transportation and radio communication.

Northern Health Service operates a hospital at Inuvik with 80 beds (30 general d 50 for extended and special care) with a staff averaging 75. It operates a 14-bed neral hospital at Frobisher Bay with a staff averaging 20. This will soon be replaced a 28-bed hospital with an unusually large percentage of beds for paediatrics.

There are 10 other hospitals in the Northwest Territories, 7 of them in the tree ea. These are operated by various agencies - missionary, business or community. ey have a combined capacity of 179 beds for extended and special care and 232 beds r general care. Together the Government and private hospital beds total 229 beds r extended and special care and 329 beds for general care. Eighty-one per cent. these beds are located in the tree area for 60% of the population.

The needs of the population for hospital services are now under major review by e Territorial Hospital Insurance Services Board. This agency of the Territorial vernment is responsible for the recently introduced hospital insurance programme stered by the Federal Government, covering general care, diagnostic services in spital in-patient and out-patient departments and, within the first 24 hours, out-tient service for accident cases. The Northern Health Service provides professional vice to the Board.

Northern Health Service operates 13 nursing stations and 10 clinics. It will ortly open urban-type health centres at Yellowknife and Hay River. Nine health ations are maintained in the smaller settlements, for local emergency use and short riods of stay by visiting professional personnel. The public health programme is sed on these smaller and more widely dispersed health facilities, with a personnel tablishment of 93.

As was indicated in Table 10, the Northern Health Service carries out an extensive ogramme of annual medical surveys throughout the Northwest Territories. These ually include, for each person who agrees to being examined, a chest X-ray, munization against diphtheria, pertussis, tetanus and poliomyelitis, medical and ntal examinations where indicated and any necessary treatment.

A programme of improvement and expansion for the period 1962-1967 has recently een approved. This will result in the construction of 4 nursing stations and 6 ealth stations, besides additional residential accommodation. There will be 40 more rofessional personnel employed, many of them in the field of public health.

The problem of bridging the language and cultural barriers between the northern ndigenous population and other Canadians, in order to improve public health and reatment services, is being met by the development of an auxiliary health worker rogramme - the training of Indian and Eskimo young men and women as sanitation aides, ssistants to the public health nurses in the field of child and maternal health and assistants to the dental officers. It is hoped to have 36 health workers by 1967. eir greatest value will be in those tiny communities that are far from the nearest spital or nursing station, where the infant mortality rate is high.

Apart from the cost of hospitalization of general cases and cases requiring ecial care for tuberculosis and mental illness, Government-sponsored health services e expected to cost some $ 990 000 in 1962-1963, or $ 42 per capita. This will be ared between the Federal and Territorial Governments in proportion to their respective sponsibilities. The Federal Government meets the cost of public health services r registered Indians and Eskimos and the Territorial Government the cost of public alth services for all other residents. Charges are made for treatment services to l residents who can pay. Those who are medically indigent, or who are living the ative way of life", have part or all of their medical care expenses paid for them. e approximate cost of all public health services, hospitalization and medical care ovided to the Eskimos is $ 285 per capita per annum.

Because of the relatively low standard of living of many of its people and the plation of some of them in small, widely dispersed groups, the people of the Northwest rritories cannot expect to enjoy a completely modern and readily available health rvice. There comes an end point in planning and in administration where it becomes gistically impossible and financially unreasonable to try to provide professional rvices at every resident's elbow. Those who insist on living in tiny groups far om lines of communication and trade centres must expect, like pioneers, to take some sks. Their persistence in this way of life will continue to be reflected in the rtality statistics and annual costs of whatever service can be provided.

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